

## ABSTRACT

An electrospray device, a liquid chromatography device and an electrospray-liquid chromatography system are disclosed. The electrospray device comprises a substrate defining a channel between an entrance orifice on an injection surface and an exit orifice on an ejection surface, a nozzle defined by a portion recessed from the ejection surface surrounding the exit orifice, and an electrode for application of an electric potential to the substrate to optimize and generate an electrospray; and, optionally, additional electrode(s) to further modify the electrospray. The liquid chromatography device comprises a separation substrate defining an introduction channel between an entrance orifice and a reservoir and a separation channel between the reservoir and an exit orifice, the separation channel being populated with separation posts perpendicular to the fluid flow; a cover substrate bonded to the separation substrate to enclose the reservoir and the separation channel adjacent the cover substrate; and, optionally, electrode(s) for application of a electric potential to the fluid. The exit orifice of the liquid chromatography device may be homogeneously interfaced with the entrance orifice of the electrospray device to form an integrated single system. An array of multiple systems may be fabricated in a single monolithic chip for rapid sequential fluid processing and generation of electrospray for subsequent analysis, such as by positioning the exit orifices of the electrospray devices near the sampling orifice of a mass spectrometer.